

DC/DC Converter

PSC312-HV

USER MANUAL



Notes to this manual

ATTENTION! Read this manual carefully before installing and commissioning the specified module. This manual is a part of the delivered module. Familiarity with the contents of this manual is required for installing and operating the specified module. The rules for prevention of accidents for the specific country and the general safety rules in accordance with IEC 364 must be observed.

The function description in this manual corresponds to the date of publishing. Technical changes and changes in form and content can be made at any time by the manufacturer without notice. There are no obligations to update the manual continually.

The module is manufactured in accordance with applicable DIN and VDE standards such as VDE 0106 (part 100) and VDE 0100 (part 410). The CE marking on the module confirms compliance with EU standards 2006-95-EG (low voltage) and 2004-108-EG (electromagnetic compatibility) if the installation and operation instructions are followed.

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Changes and errors excepted.

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DC/DC converter
PSC312-HV

User Manual
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Revision	Description of change	Writer	Date
1.0	First edition.	RTH	2009-11-18
1.1	Designation of the input voltage range modified.	RTH	2010-04-06

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1A. Safety Instructions



Warning!

Because several components of operating electrical modules are charged by dangerous voltage, the improper handling of electrical modules may be the cause of accidents involving electrocution, injury, or material damages.

- Operation and maintenance of electrical modules must be performed by qualified skilled personnel such as electricians in accordance with EN 50110-1 or IEC 60950.
- Install the module only in areas with limited access to unskilled personnel.
- Before starting work, the electrical module must be disconnected from mains. Make sure that the module is earthed.
- Do not touch connector pins as they can be charged with dangerous voltage up to 30 seconds after disconnection.
- Only spare parts approved by the manufacturer must be used.

1B. Electric Waste Disposal

Separate collection is the precondition to ensure specific treatment and recycling of waste electrical and electronic equipment and is necessary to achieve the chosen level of protection of human health and the environment.

In the case of waste disposal of your discarded equipment we recommend to contact a waste management company.

2. General Information

The DC/DC converter PSC312 converts DC input voltage to an electrically isolated DC output voltage.

The PSC312 is a hot plug-in module with rear side connectors. It is designed to be mounted in an assembly set 19" sub rack (see section 3.2). Due to the state-of-the-art circuitry design, the unit has very low losses and therefore very compact dimensions, low weight and high power density.

The DC/DC converter PSC312 can be used as constant voltage source in all DC applications.

The nominal output power per unit is 1200 W. Several modules can be switched in parallel to increase the system output power or to build redundant power supply systems (n + 1-principle).

3. Type Range/Equipment

Type Designation	Material Code	Nominal Output Voltage	Nominal Output Current
PSC312-HV/24-50	201-012-748.00	24V _{DC}	50A _{DC}
PSC312-HV/48-25	201-012-758.00	48V _{DC}	25A _{DC}
PSC312-HV/60-20	201-012-768.00	60V _{DC}	20A _{DC}
PSC312-HV/110-11	201-012-778.00	110V _{DC}	11A _{DC}
PSC312-HV/220-5.5	201-012-788.00	220V _{DC}	5.5A _{DC}

3.1 Main Data

Input voltage range: 91.7-300V_{DC}
Input current: 12.4A_{DC} @ 110V_{DC}; 6.2A_{DC} @ 220V_{DC}
Nominal output power: 1200W

For more specific data, see section 7.

3.2 Available Options and Assembly Equipment

Designation	Material Code
Assembly set 19" sub rack 3U incl. backplane for four DC/DC converters PSC312	202-312-408.00
Cover plate (with handle) to cover empty slots, 1/4 x 19", 3U; Colour: RAL 7035	881-MEC-BPL.03.21.B
CAN dongle, incl. software; necessary to change the output voltage value/internal default values of the DC/DC converter.	880-CAN-DNG.00



Figure 1) Sub rack fully equipped with four converters PSC

3.3 Front view/Front side LED panel



Figure 2) Front view

→ The PSC312 is equipped with the following four LED indicators:

- INPUT OK
- OUTPUT OK
- Vout>
- ALARM

For more information about the LED indicators, see section 4.4

→ Two captive screws are used for each module to secure it to the sub rack (component parts of the module)

3.4 Rear Side Connection

The rear side male connections (DC input voltage, DC output voltage and signals) are shown in figure 3) and are defined in the table below.

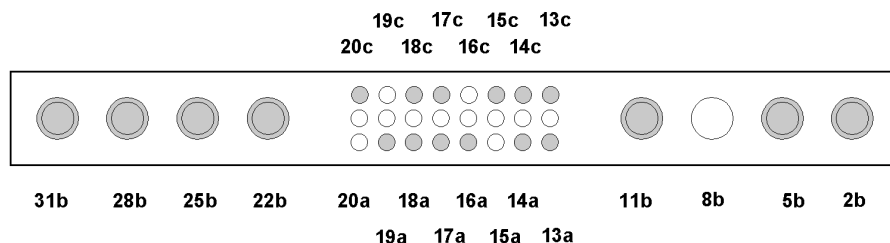


Figure 3) Male connectors (shown from the rear side of the module)

Pin assignment of the rear side connector:

Pin	Function
2b	- (Minus) DC input
5b	+ (Plus) DC input
8b	---
11b	PE
13a	CAN - CVSS
13c	(-) output voltage sense link
14a	CAN - H
14c	CAN - L
15a	---
15c	CAN - CVCC
16a	AGND
16c	---
17a	Hardwarecoding CODE2
17c	Hardwarecoding CODE1
18a	Collective Alarm NC
18c	Collective Alarm COM
19a	Collective Alarm NO
19c	---
20a	---
20c	(+) output voltage sense link
22b	(-) Output
25b	(-) Output
28b	(+) Output
31b	(+) Output

3.5 Cooling and Air Flow Direction

The unit is cooled with an internal fan. The airflow is from the front to rear side. The fan is monitored and speed controlled dependent on module temperature. To provide sufficient air flow, a minimum space (see item “A” in figure 5) of 50 mm is required between the unit and the rear cabinet wall as well as an unobstructed supply of air to the front of the module.

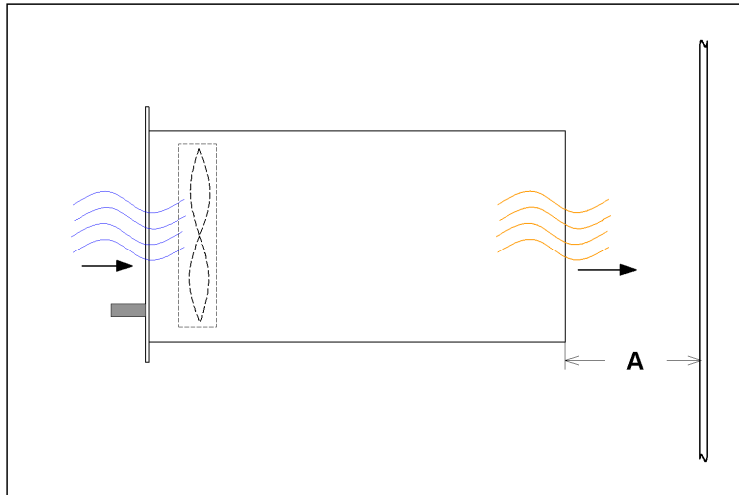


Figure 4) Module air flow

3.6 Communication Interface

The DC/DC converter PSC312 is fitted with a serial data interface in accordance with the Controller Area Network (CAN) specification. The CAN-Bus connection is integrated in the rear side connector.

Several modules in a system or parallel connection can be monitored through the CAN-Bus by a central UPC3 DC controller unit.

The following parameters of a specific DC/DC converter unit can be monitored:

- Output voltage
- Output current
- Device temperature
- Device status

4. Handling

4.1 Storage

Modules must be stored in a dry, dust free environment with a storage temperature in accordance with the specific technical data (see section 7).

4.2 Commissioning

Note: Before commissioning the module, make sure that the input voltage corresponds to the input voltage range of the unit as specified on the type plate and that the output voltage of paralleled units matches.

1. Carefully unpack the unit
2. Fill the rack beginning with the left slot.
3. Put the unit into an empty slot.
4. Carefully slide in the unit until the module connector touched the backplane connector.
5. Increase the force until the unit fits in completely. Avoid using too much force. If the unit does not fit in, begin again at step 3.
6. Secure the module using the two captive screws (M3x12) provided with the module.

Note: The PSC312 is serially equipped with an internal output side decoupling diode. This ensures hot plug-in capability for the module and enables the operator to **add** modules under operating conditions.

Note: If a module is to be **removed**, it **previously** must be **switched off** by the external input fuse!



CAUTION!

After switching off the module the internal capacitors are still fully charged. Do not touch connector pins as they can still be charged with dangerous voltage after disconnection.

4.3 Charge Characteristic





The charge characteristic of the PSC312 is a power limited IV characteristic curve in accordance with DIN 41772/DIN 41773.

For modules in parallel operation mode a load distribution of about $\pm 10\%$ is attained due to a sloping output voltage line (-1% at 100% I_{nom}).

The module is continuously short circuit proof.

4.4 LED Indications

Functions of front panel LED indicators

LED	Colour	Function
	green	INPUT OK - Input voltage okay (criteria: $V_i = 100V_{DC}$ to $300V_{DC}$)
	green	OUTPUT OK - Vout ok (criteria: $V_{out} \geq 95\%$ of adjusted value)*
	red	$V_{out} >$ (criteria: $V_{out} \geq$ than adjusted operating threshold)*
	red	ALARM - Collective alarm**: V_{in} incorrect, V_{out} incorrect, module overtemperature, fan failure and short circuit

*For factory set output voltage threshold values, see section 4.6

**The module is equipped with an isolated signalling contact (normally open contact).
The maximum load is $60V_{DC}/500mA$. The contact is time-delayed and reacts after approx. 10 sec.

4.5 Monitoring

Monitored values	Criteria	Function
DC input voltage	<p>I.) Input voltage $100V \leq V_{in} \leq 300V$</p> <p>II.) Input voltage $< 90V$</p> <p>III.) Input voltage $> 300V$</p>	<p>I.) If the values are exceeded/fallen below, it is shown at "collective alarm"; the green LED "Input ok" is off.</p> <p>II.) The module automatically switches off. It switches on at 95V.</p> <p>III.) At $V_i > 300V$ the module automatically switches off (self locking).</p>
DC output voltage	<p>I.) Output voltage higher than the adjusted operating threshold $V >^*$</p> <p>II.) Output voltage lower than the adjusted operating threshold $V <^*$</p>	<p>I.) The module automatically switches off (self locking). The unit must be manually restarted.</p> <p>II.) That event is included in "Collective Alarm" (LED and relay)</p>
Module temperature	Heat sink temperature $\geq 80^\circ C$	<p>The module automatically switches off. It automatically switches on when the heat sink cools down to $\leq 70^\circ C$.</p> <p>From $70^\circ C$ to $80^\circ C$ the output power linearly decreases from 1200W to 200W.</p>
Cooling fan	Cooling fan malfunction	The module automatically switches off.
Short circuit	Module automatically detects short circuit operation on the basis of the output voltage value. (criteria: $V_{out} \leq 83.3\% \times V_{on} \text{ and } I_o > I_{on}/5$)	The module automatically switches off after five seconds. After 30 seconds the module automatically tries to restart repeatedly.

*For factory set output voltage threshold values, see section 4.6

4.6 Threshold- & Default Values

The following factory set threshold- & default values are stored in the PSC312:

Default	24V version	48V version	60V version	110V version	220V version
Vo (V _{DC})	24.0	48.0	60.0	110.0	220.0
V> (V _{DC})	25.2	50.4	63.0	115.5	231.0
V< (V _{DC})	22.8	45.6	57.0	104.5	209.0
Iconst (A _{DC})	50.0	56.3	45.0	25.0	12.5
Pconst (1200W)	(50A @ 24V)	(25A @ 48V)	(20A @ 60V)	(11A @ 110V)	(5,5A @ 220V)

4.7 Setting of the output voltage/threshold values

The output voltage/threshold values individually can be set within the scope of the output voltage adjustment range (see section 7) using a CAN dongle and PC software (see section 3.2 “Available Options and Assembly Equipment”). A specific manual is available on request.

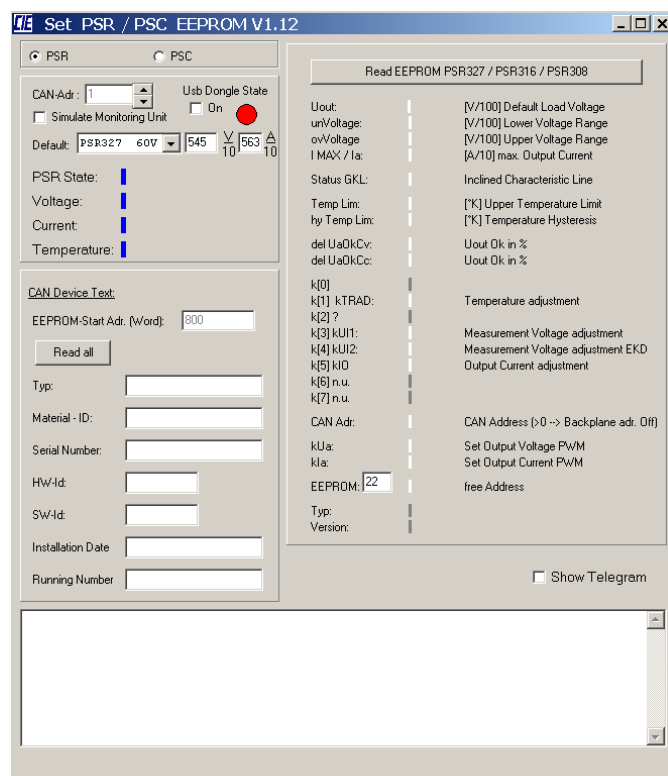


Figure 5) Screenshot “PC software for CAN-Dongle”

5. Maintenance

In general, the module is maintenance-free. Exclusively the fan is a component consisting of moving parts. By way of precaution a yearly inspection with following checks is recommended:

- Mechanical/visual inspection
- Removal of dust and dirt, especially on radiator surfaces
- Check for internal dust or humidity

It is recommended to exchange the fan every five years.

Attention! Dust combined with moisture or water may influence or destroy the internal electronic circuits.

Dust inside the unit can be blown out with dry compressed air.
The interval between the checks depends on ambient conditions of the installed module.

6. Troubleshooting

Symptom	Possible reason	Corrective action
No output voltage	Is input voltage present?	Check
	Input switched to "ON" position?	Check
	PSC312 module plugged in securely?	Check
	Incorrect polarity or short circuit at the output?	Check
	LED V> on?	1.) Switch the module off and on. 2.) Check the settings for V> (see section 4.6).
Deviation of the output voltage	Is the unit operating in current limiting mode due to overload?	Reduce the load
	If an external sensor lead is used for the output voltage, is the connection faultless?	Check

If the module still does not work even though all checks have been done, contact your sales agent or the ELTEK VALERE DEUTSCHLAND service department.

7. Technical Specifications

Type designation	PSC312-HV/ 24-50	PSC312-HV/ 48-25	PSC312-HV/ 60-20	PSC312-HV/ 110-11	PSC312-HV/ 220-5.5
Material code	201-020-758.00	201-012-758.00	201-012-768.00	201-012-778.00	201-012-788.00
DC input:					
Input voltage range	91.7-300V _{DC} ; switch-off @ <90V _{DC}				
Input current	12.4A _{DC} @110V _{DC} ; 6.2A _{DC} @220V _{DC}				
Total harmonic distortion (THD)	<5%	←	←	←	←
Efficiency	≥88%	←	←	←	←
Internal input fusing	16A (6.3 x 32mm)	←	←	←	←
DC output:					
Nominal output voltage*	24V _{DC}	48V _{DC}	60V _{DC}	110V _{DC}	220V _{DC}
Nominal output current	50A _{DC} (@ 24V)	25A _{DC} (@ 48V)	20A _{DC} (@ 60V)	11A _{DC} (@ 110V)	5.5A _{DC} (@ 220V)
Max. output current @ short circuit condition	50A _{DC}	56A _{DC}	45A _{DC}	25A _{DC}	12.5A _{DC}
Nominal output power	1200W	←	←	←	←
Charge characteristic	IV characteristic according to DIN41772/DIN41773; power limited				
Adjustable output voltage range*	21.0 - 33.0V _{DC}	42 – 62V _{DC}	52.5 – 78V _{DC}	87 – 150V _{DC}	170 – 295V _{DC}
Factory set output over voltage threshold* V> (105% V _{nom})	25.2V _{DC}	50.4V _{DC}	63.0V _{DC}	115.5V _{DC}	231.0V _{DC}
Factory set output under voltage threshold* V< (95% V _{nom})	22.8V _{DC}	45.6V _{DC}	57.0V _{DC}	104.5V _{DC}	209.0V _{DC}
*The output voltage/threshold values individually can be set within the scope of the output voltage adjustment range using a CAN dongle and PC software.					
Voltage ripple	≤20mVpp	≤20mVpp	≤20mVpp	≤100mVpp	≤200mVpp
Psophometric acc. to CCITT-A	≤1.2mV	≤1.8mV	≤1.8mV	---	---
Dynamic accuracy of the charge voltage	<3% V _{nom} at load changes between 10%-90%-10% I _{nom} ; transient time ≤1.5ms				
Short circuit protection	Continuously short circuit proof				

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Type designation	PSC312-HV/ 24-50	PSC312-HV/ 48-25	PSC312-HV/ 60-20	PSC312-HV/ 110-11	PSC312-HV/ 220-5.5
Parallel operation	Yes (max. 48 units with UPC3 DC controller unit); current distribution ≤10% Inom; sloping output voltage line (-1% at 100% Inom)				
Internal decoupling at the output	Yes; active, low-loss decoupling circuit in the negative output line	←	←	Yes, in the positive output line	←
Internal output fuse	80A	80A	80A	30A	20A
Standard Features:					
LED signalling	Input OK (green), Vo OK (green), Vo > (red), Alarm (red)				
Main processor	16Bit Fujitsu	←	←	←	←
Isolated signalling contact	Collective alarm; relay COM/NC/NO, maximum load: 60V _{DC} /500mA				
Communications interface	CAN-Bus, proprietary protocol				
Environmental:					
Ambient temperature	Operation: -20°C to +55°C, storage: -40°C to +85°C				
Climatic conditions	according to IEC 721-3-3 class 3K3/3Z1/3B1/3C2/3S2/3M2				
Max. installation altitude	≤ 1500m	←	←	←	←
Audible noise	<45dBA	←	←	←	←
Mechanical:					
Type of construction	¼ x 19", 3U	←	←	←	←
Cooling	Fan cooling (temperature-controlled; r.p.m.-monitored)				
Electrical connector	DC input, DC output and signals: DIN41612-M-connector				
Dimensions (W/H/D)	106.3/133/326.5mm				
Minimum installation depth	438 mm plus 25.5mm handle depth (in combination with an assembly set 19" sub rack)				
Weight	approx. 3.9kg	←	←	←	←
Type of enclosure / Protection class	IP20 (front panel) / 1				
Colour	Front panel: RAL 7035; print: neutral jet black, RAL 9005				
Compliances:					
CE conformity	yes	←	←	←	←
Compliance to safety standards	EN60950-1; VDE0100 T410; VDE0110; EN50178; EN60146				
Compliance to EMC standards	EN55022/24 (ITE), class "A"; EN61000-4 T2-5				

7.1 Dimensional Drawings

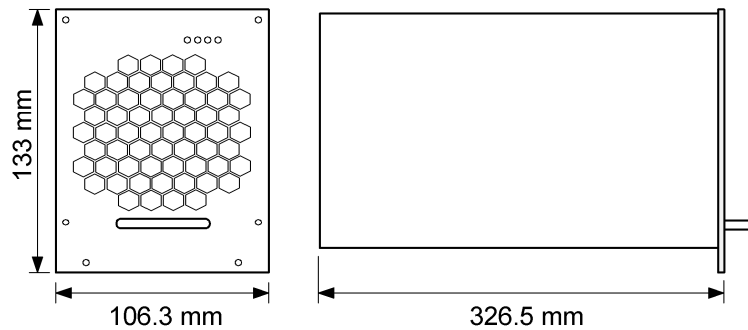


Figure 6) Module dimensions

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